



Armed Forces College of Medicine AFCM



Elbow & radio-ulnar joints

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INTENDED LEARNING OBJECTIVES (ILO)



By the end of this lecture the student will be able to:

- 1) Describe type, articular surfaces, fibrous capsule, synovial membrane, ligaments, movements, arterial and nerve supply of elbow joint.
- 2) Describe type, articular surfaces, fibrous capsule, ligaments and movements of radioulnar joints.

Lecture Plan

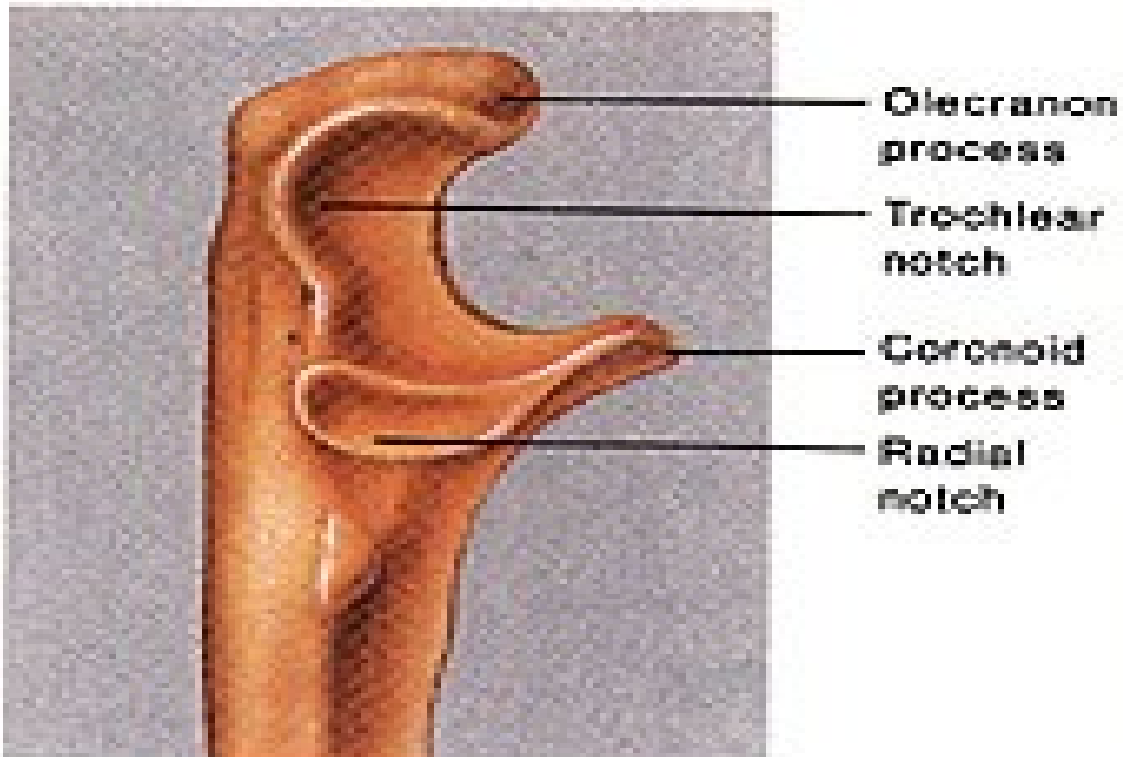


- Part 1 (20 min): Elbow joint.
- Part 2 (20 min): Radio-ulnar joints.
- Summary (5 min)

Revision of the bones involved

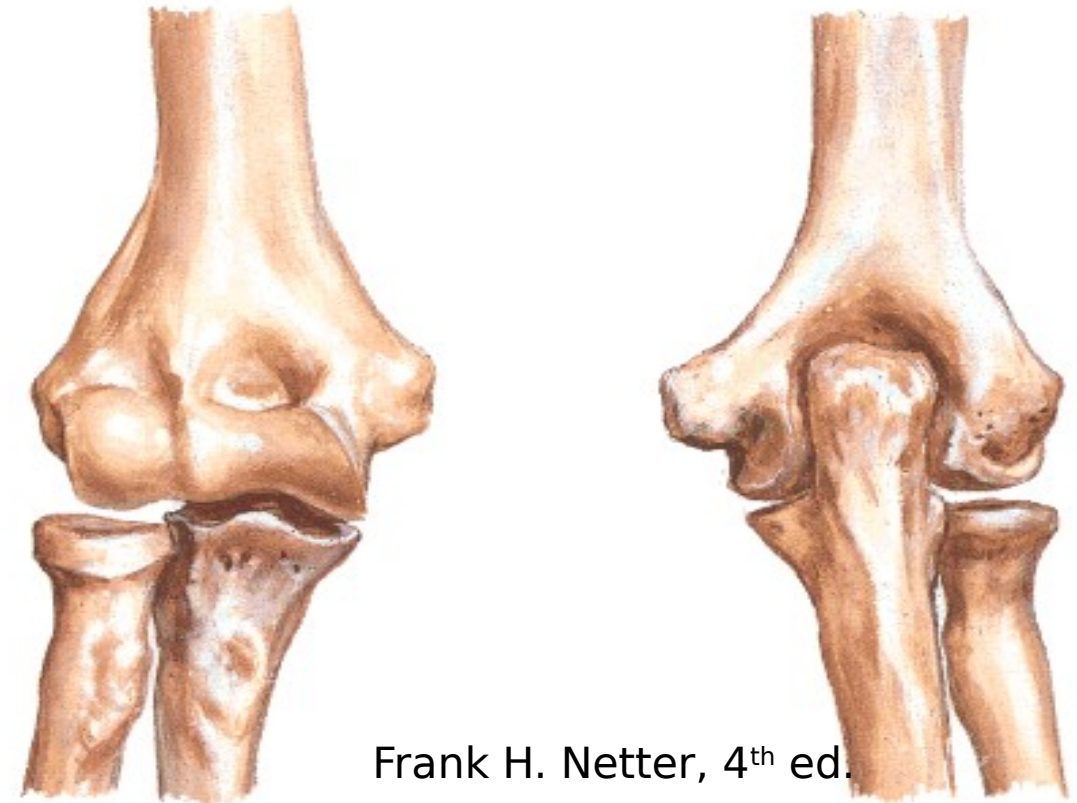


Upper end of ulna (Lat. View)



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Bones of Elbow in Extension Anterior and Posterior Views



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Ant. View

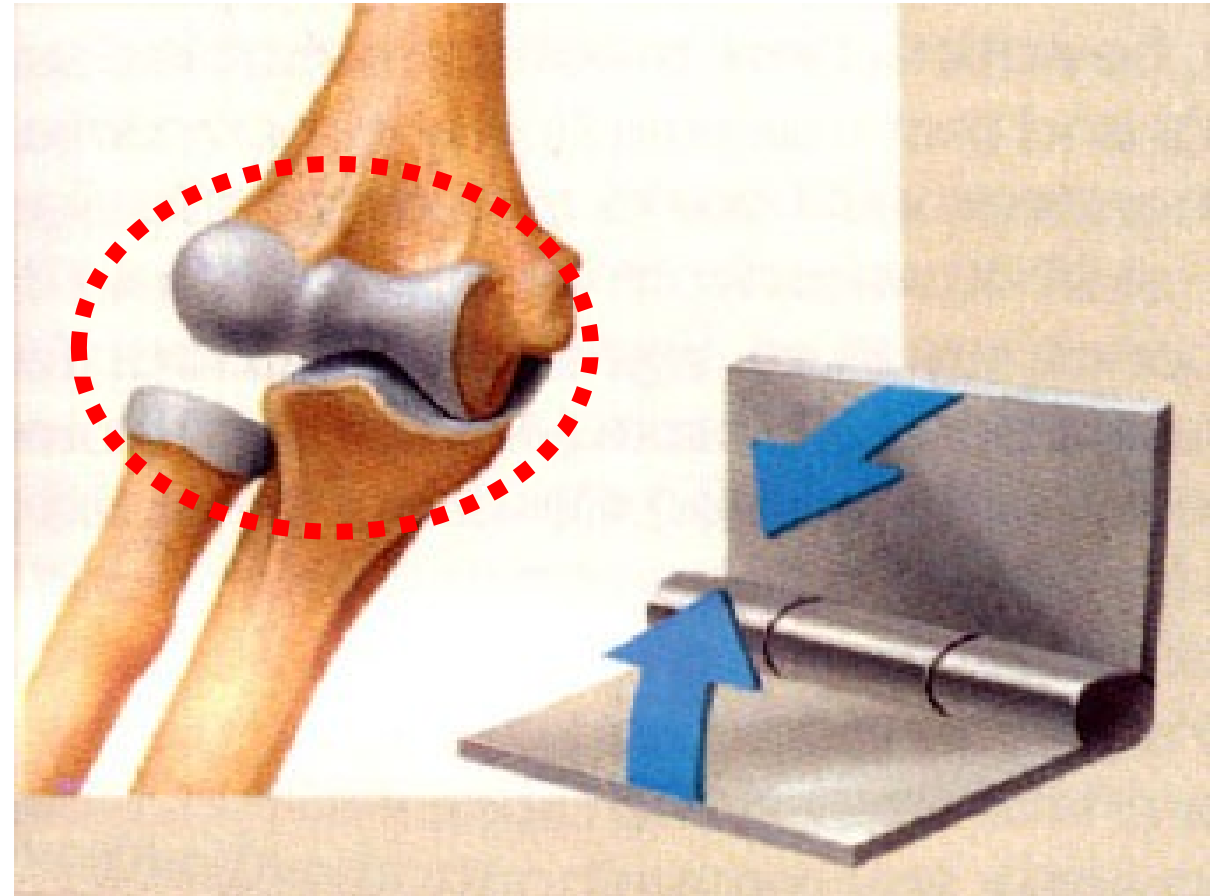
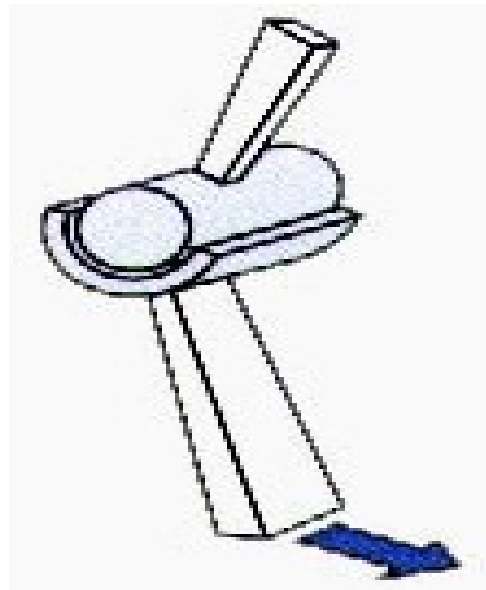
Post. View

ELBOW JOINT

I. Type



- **Type:**
Synovial-hinge joint



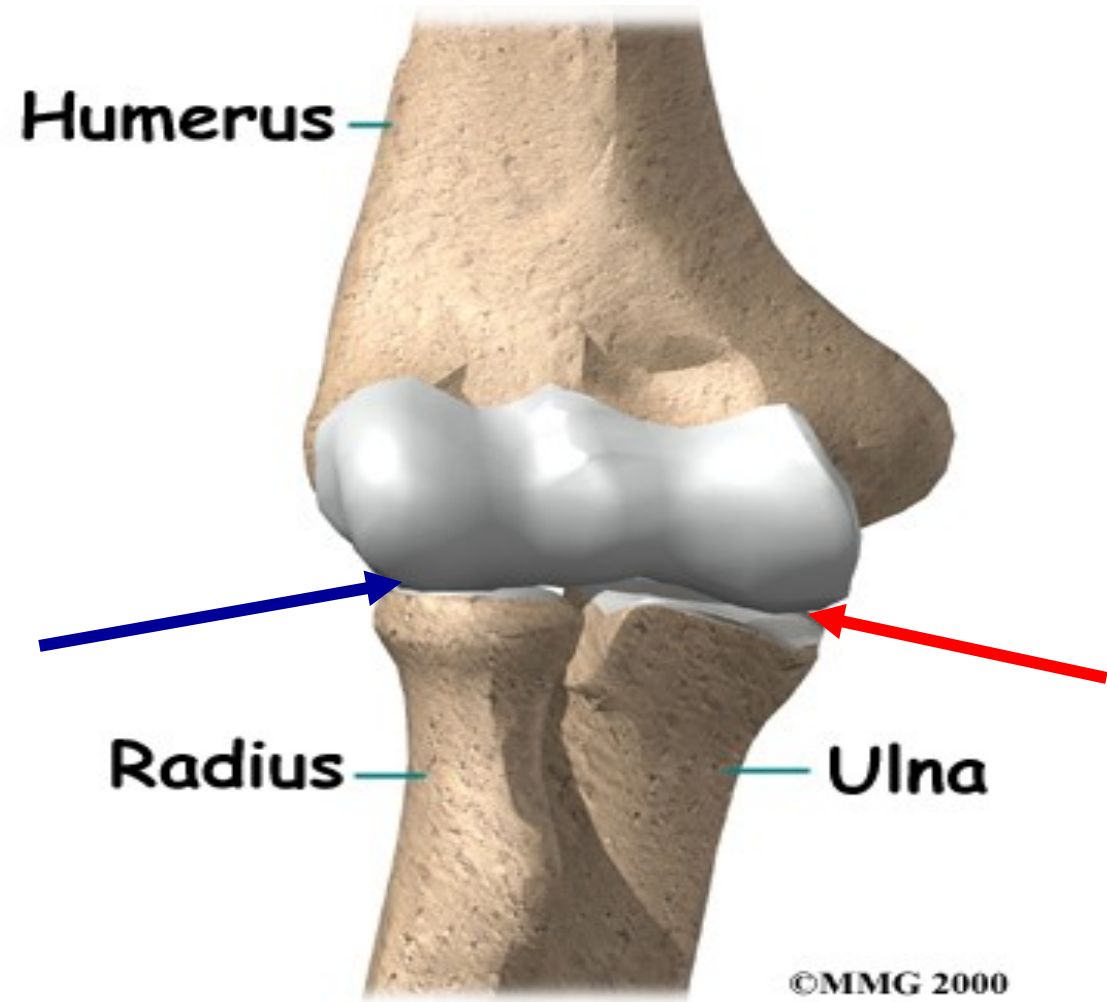
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II. Articular surfaces:

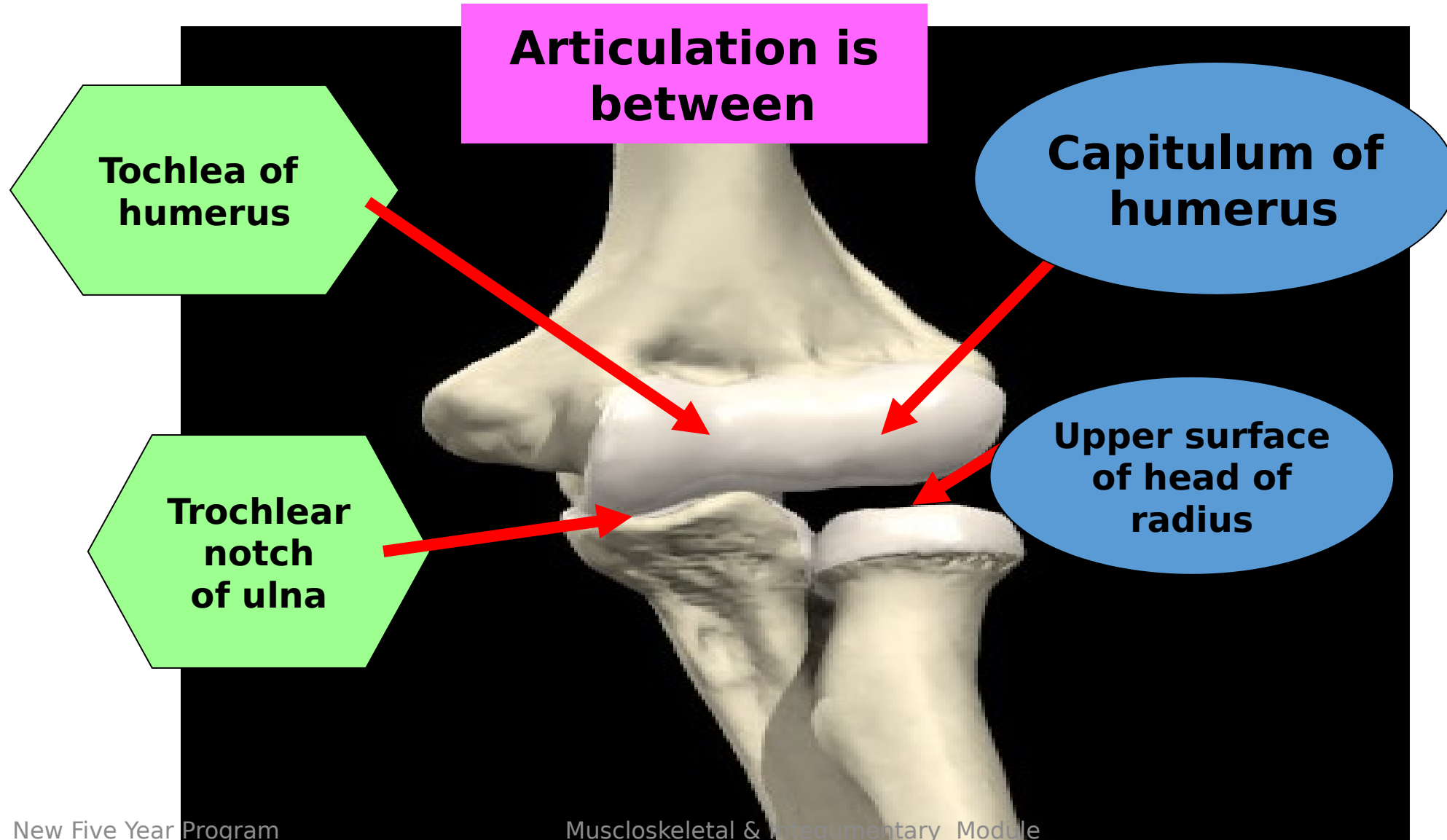


**1- Humero-ulnar
articulation**

**2- Humero-radial
articulation**



II. Articular surfaces:



III. Capsule:

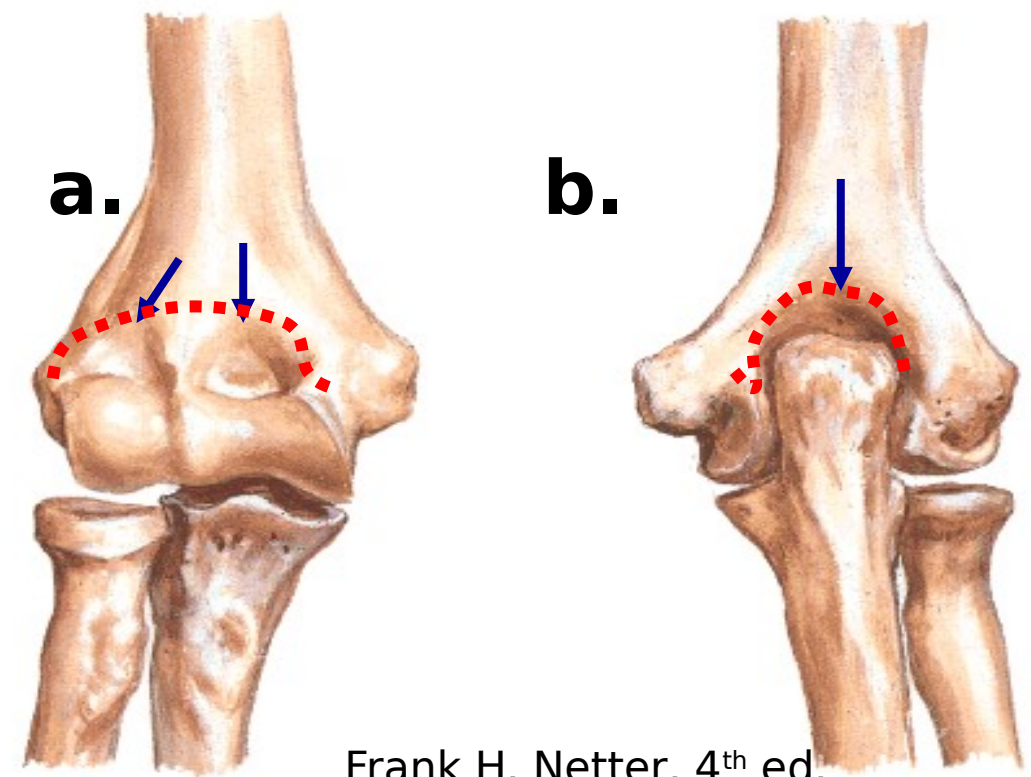


- **Surrounds articulating surfaces**

1) Superiorly □

- a. **Front of humerus above coronoid & radial fossae.**
 - b. **Back of humerus above olecranon fossa.**
- **i.e. the 3 fossae are intracapsular**

Bones of Elbow in Extension
Anterior and Posterior Views



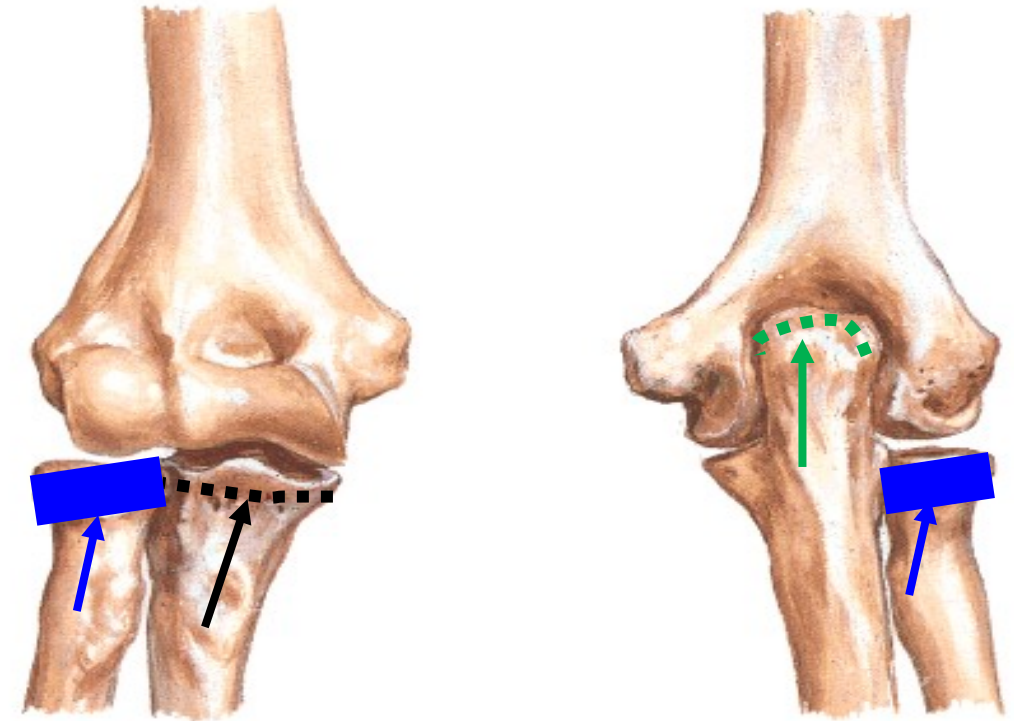
Frank H. Netter, 4th ed.

III. Capsule:



2) Inferiorly □ **to**
margins of coronoid
& olecranon
processes & to
annular ligament
(surrounding head
of radius)

Bones of Elbow in Extension
Anterior and Posterior Views

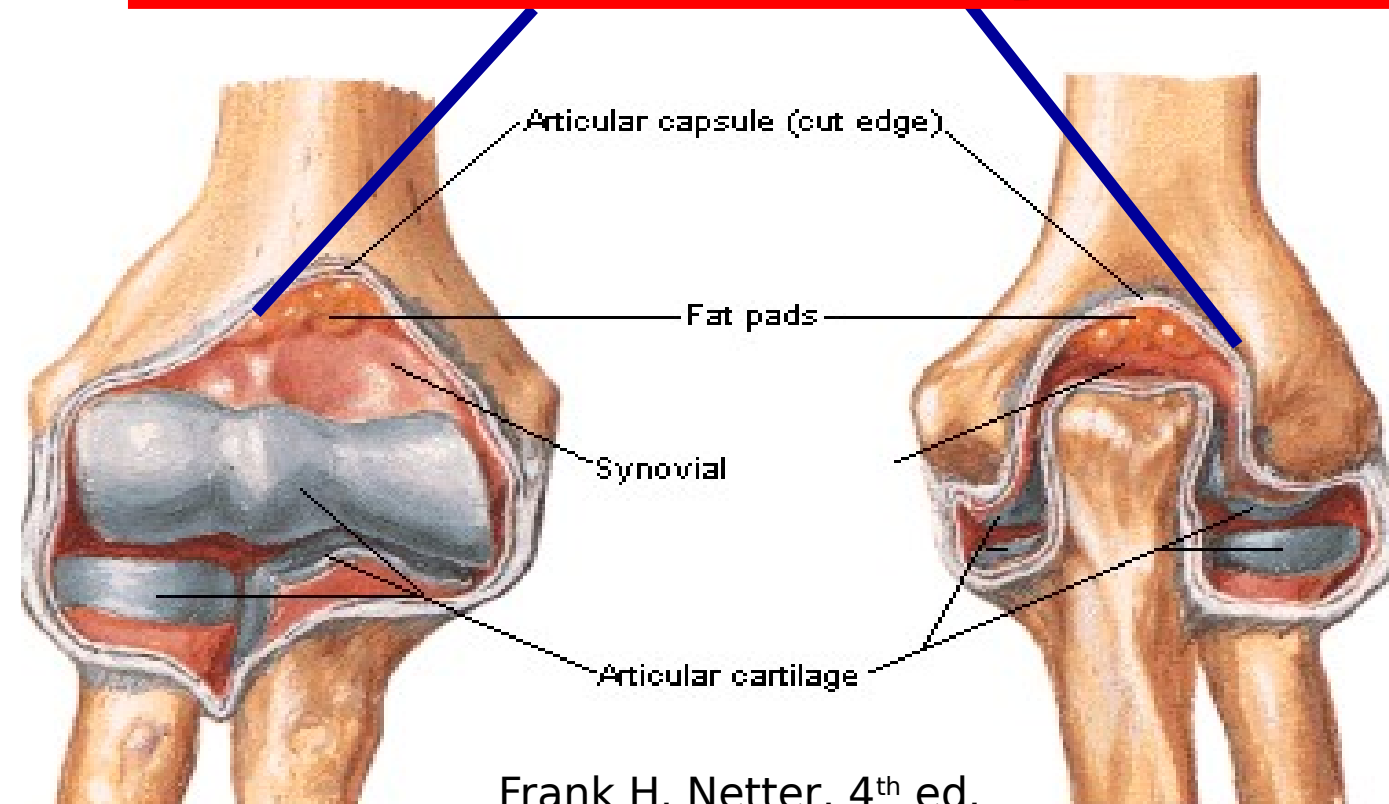


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Elbow Joint [Opened]

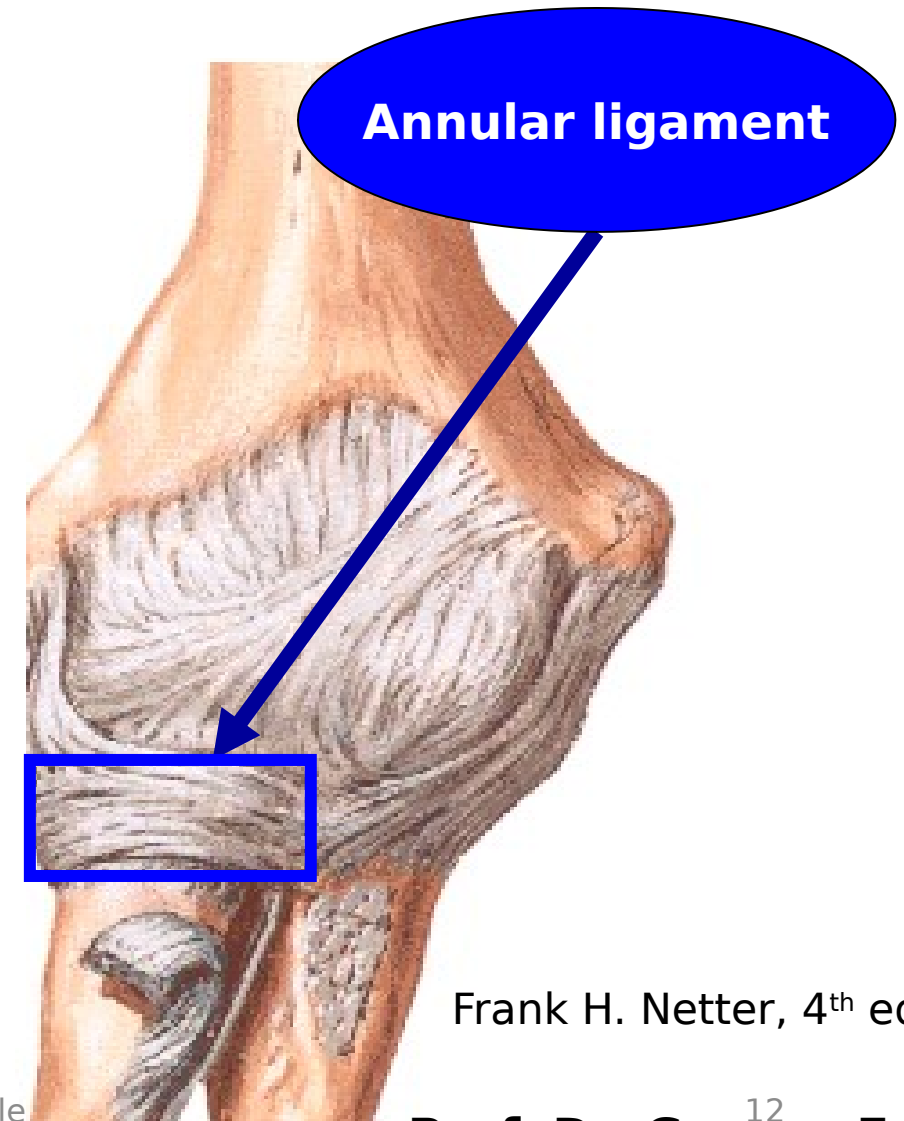
Anterior and Posterior Views

Line of attachment of articular capsule



Ligaments of Elbow

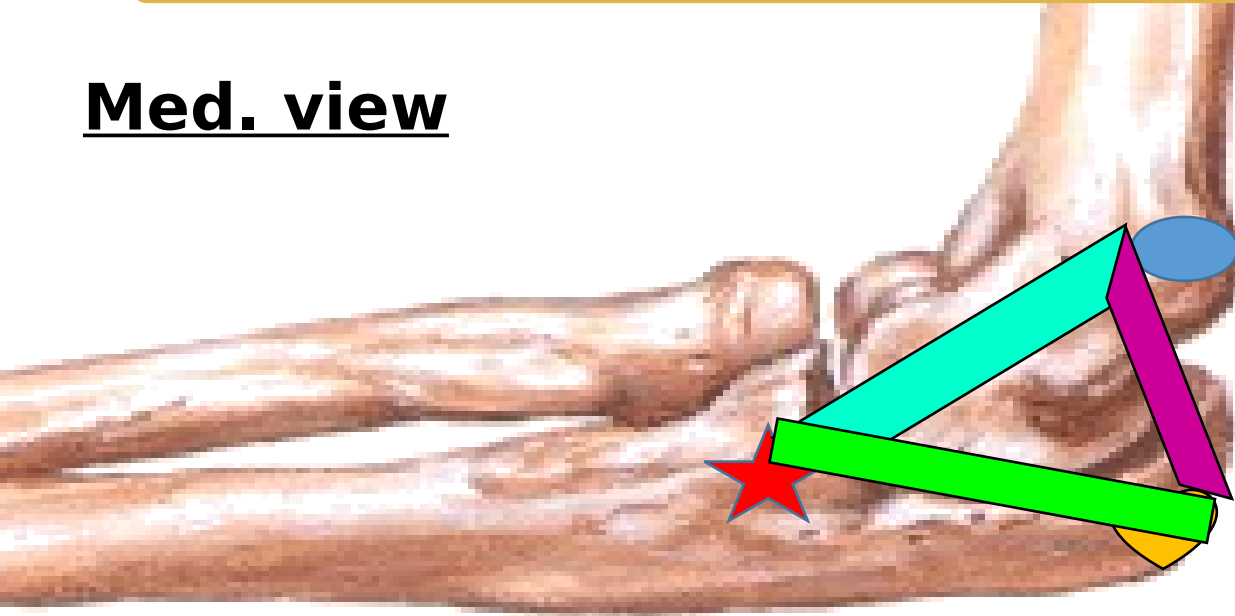
Anterior View



IV. Ligaments:



Med. view



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1- Med. (Ulnar collateral) ligament:

@ Triangular in shape formed of **3 bands** connecting **3 bony features**:

- Tip of med. epicondyle of humerus.
- Med. aspect of coronoid process of ulna.
- Med. aspect of olecranon process of ulna.

@ These 3 bands are:

- Ant. Band:** between tip of med. epicondyle of humerus & med. aspect of coronoid process of ulna.
- Post. band:** between tip of med. epicondyle of humerus & med. aspect of olecranon process of ulna.

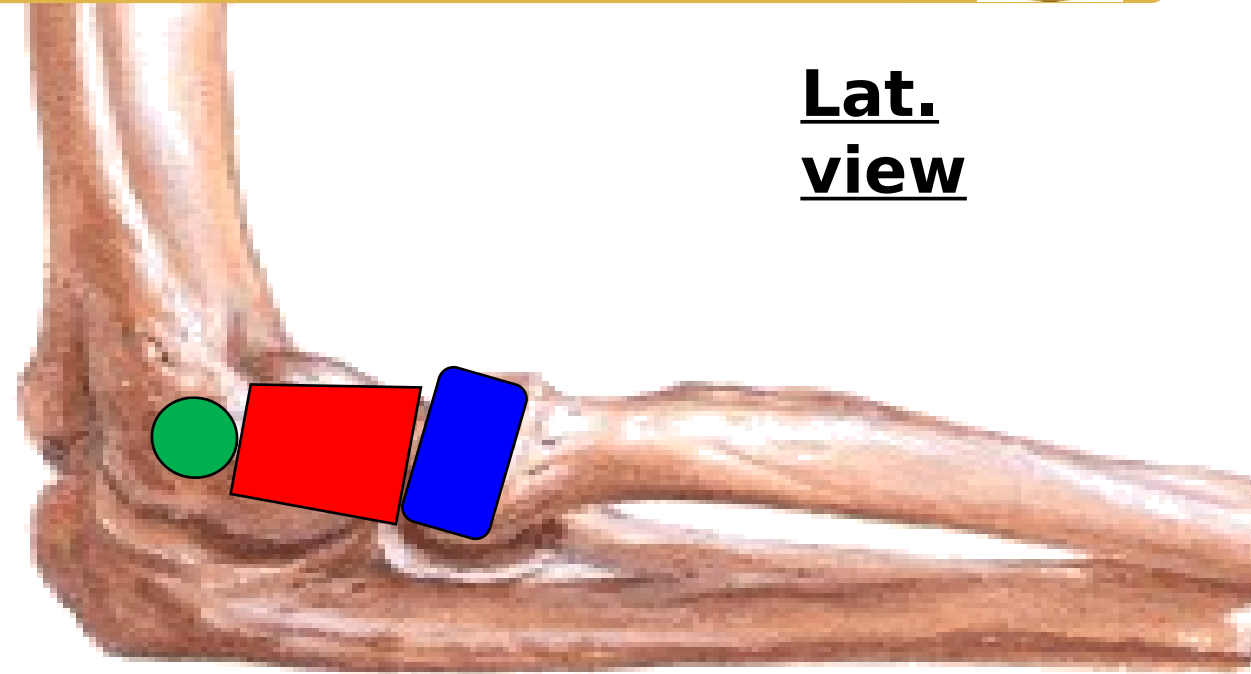
IV. Ligaments:



2- Lat. (Radial collateral) ligament: Δ

- Connects **lateral epicondyle** of humerus to upper border of **annular ligament** (surrounding head of radius)

Lat.
view

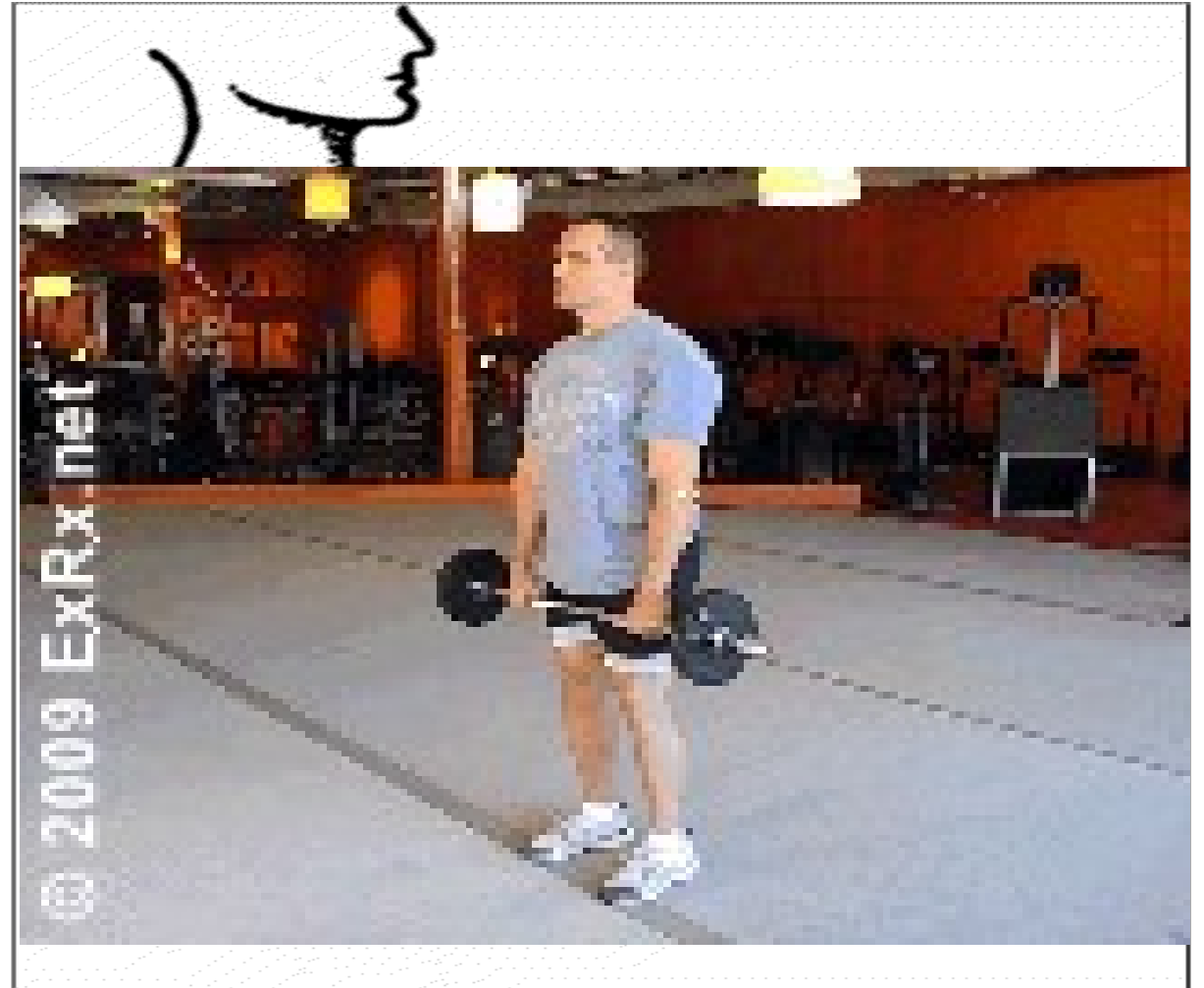


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V. Movements:



- **Uniaxial joint**
which permits
flexion &
extension only





**Pronation & supination take place
in the **radioulnar joints****

NOT IN THE ELBOW JOINT

VI. Arterial supply:



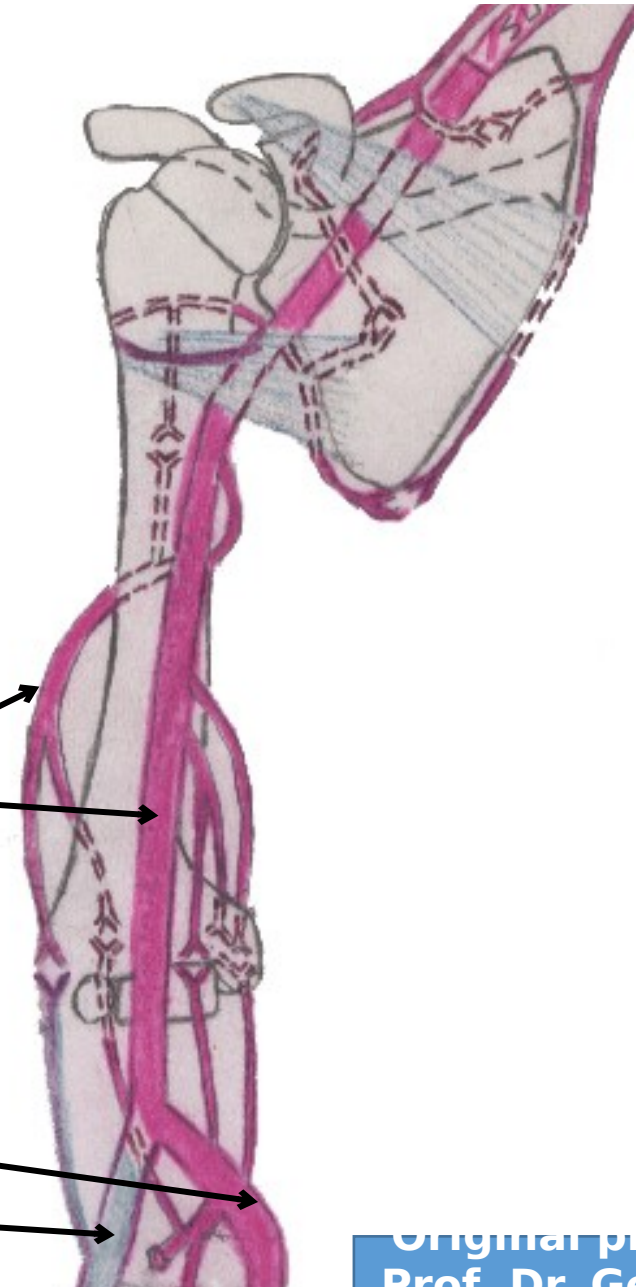
- Anastomosis
around elbow by
branches from:

1. Brachial A.

2. Profunda brachii A.

3. Ulnar A.

4. Radial A.



Original picture by
Prof. Dr. George F.B.

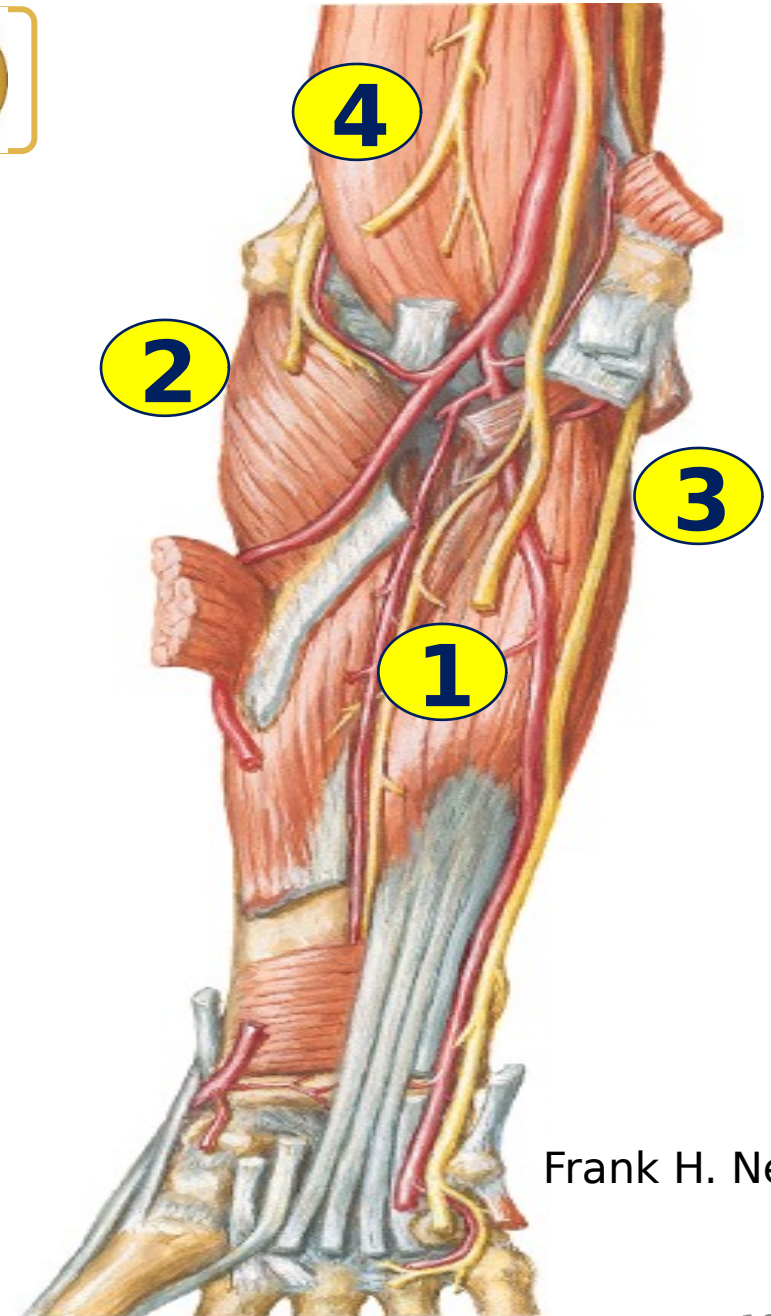
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VII. Nerve supply:



- By branches from:

1. Median nerve
2. Radial nerve
3. Ulnar nerve
4. Musculo-cutaneous nerve



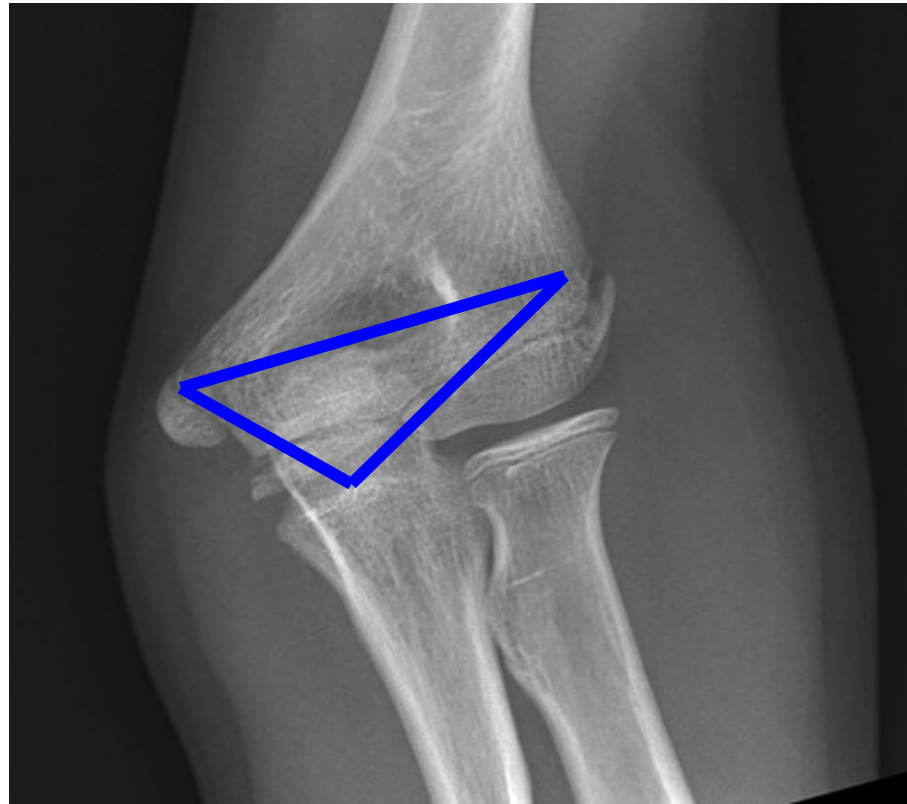
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VIII. Clinically applied points: In normal elbow



1) In extension, the medial and lateral humeral epicondyles and the olecranon process of ulna are in **a straight line**.

2) In flexion, the bony points form the boundaries of **a triangle**.



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VIII. Clinically applied points: 1) In elbow dislocation



- This arrangement is disrupted.



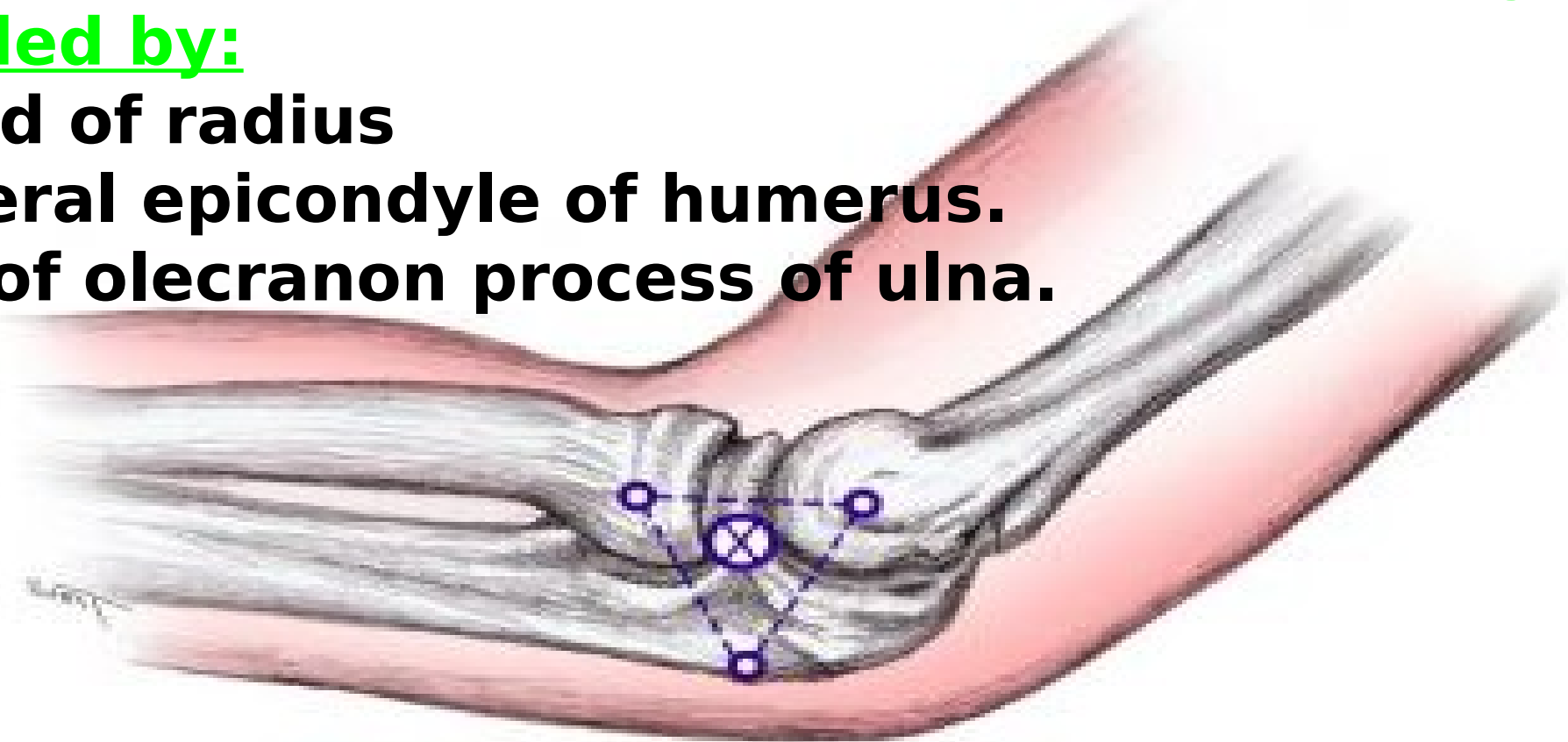
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VIII. Clinically applied points: 2) Arthrocentesis of elbow



Introduce the needle in the center of the triangle bounded by:

- a) Head of radius
- b) Lateral epicondyle of humerus.
- c) Tip of olecranon process of ulna.



Lecture Quiz



After a severe fall on the elbow, a 5-years-old male child experienced severe pain in his right elbow. The orthopedic specialist diagnosed an avulsed (torn) medial collateral ligament. Which of the following structures might be affected as well?

- A. Medial epicondyle of humerus.**
- B. Lateral epicondyle of humerus.**
- C. Lateral aspect of coronoid process of ulna.**
- D. Superior aspect of olecranon process of ulna.**

Lecture Quiz **Answer**



After a severe fall on the elbow, a 5-years-old male child experienced severe pain in his right elbow. The orthopedic specialist diagnosed an avulsed (torn) medial collateral ligament. Which of the following structures might be affected as well?

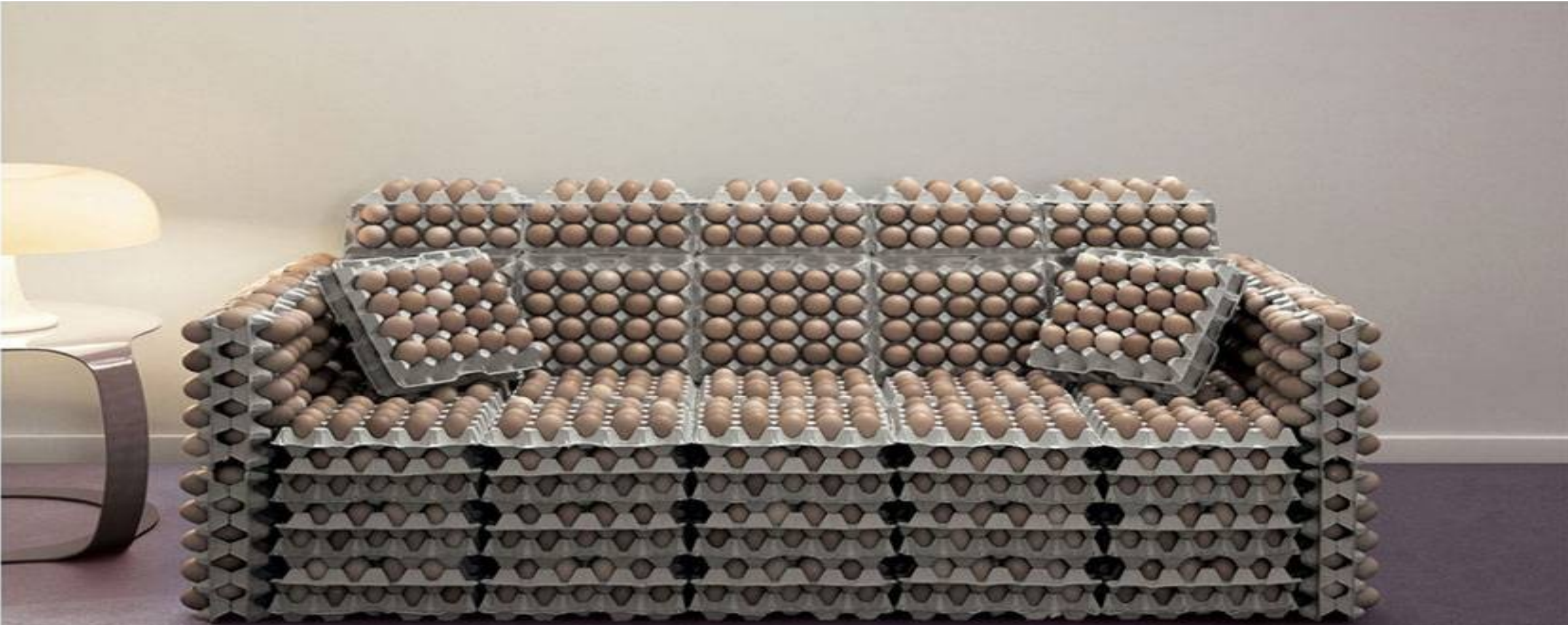
A. Medial epicondyle of humerus.

B. Lateral epicondyle of humerus.

C. Lateral aspect of coronoid process of ulna.

D. Superior aspect of olecranon process of ulna.

Relax, if you can



Radio-ulnar joints

3 Radio=ulnar joints

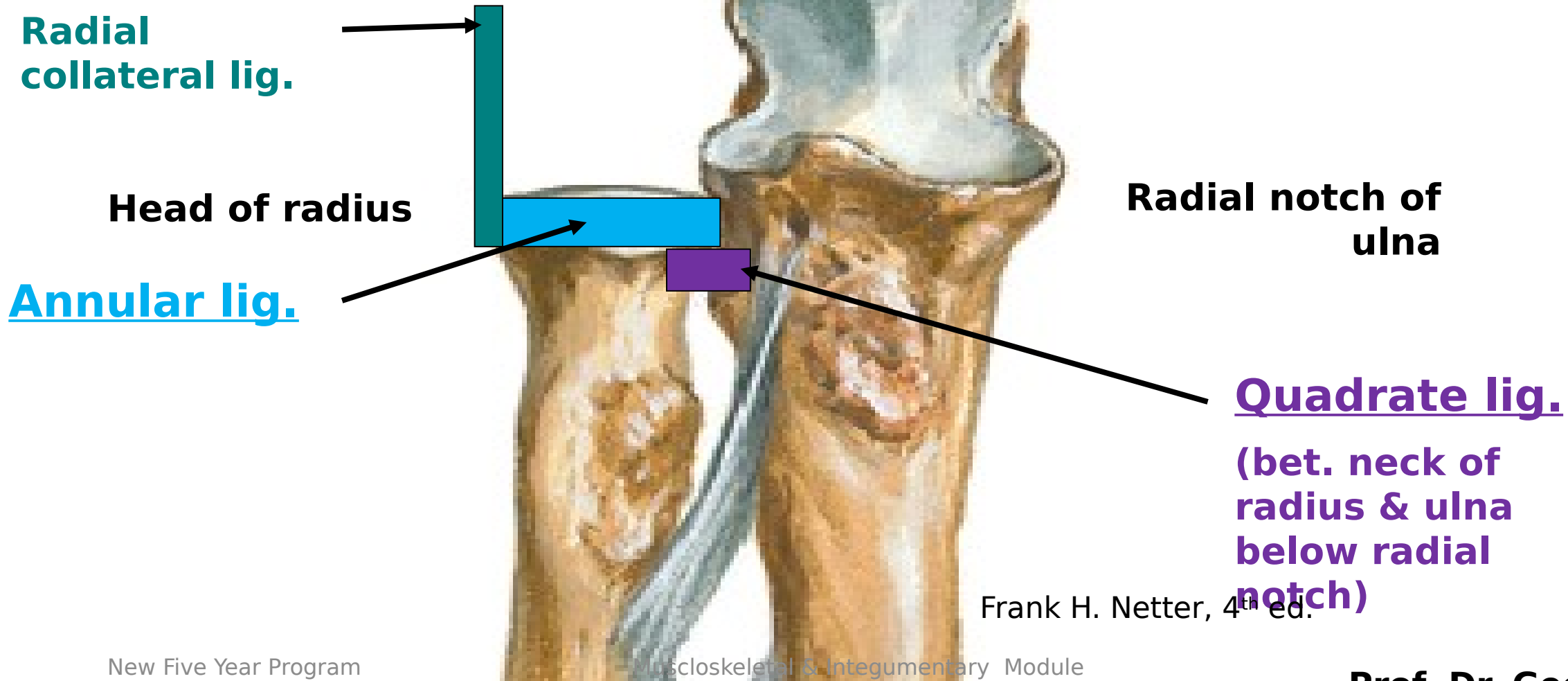


- 1) Superior (synovial- pivot).**
- 2) Middle = Interosseous membrane (fibrous)**
- 3) Inferior (synovial- pivot).**

1) Sup. Radio-ulnar Joint (synovial- pivot)



Articular surfaces



1) Sup. Radio-ulnar Joint (synovial- pivot)



@ Type: Synovial- pivot.

@ Articular surfaces:

- 1- Circumference of head of radius.
- 2- Radial notch of ulna.

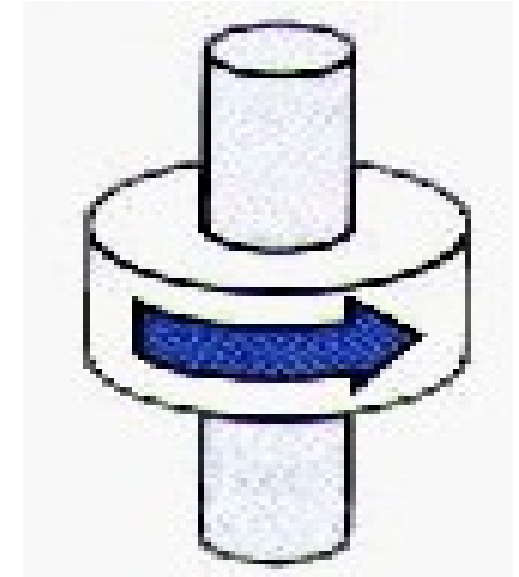
@ Ligs.:

1- Annular lig. ??

2- Quadrate lig. (bet. neck of radius & ulna below radial notch) closes the J. from below.

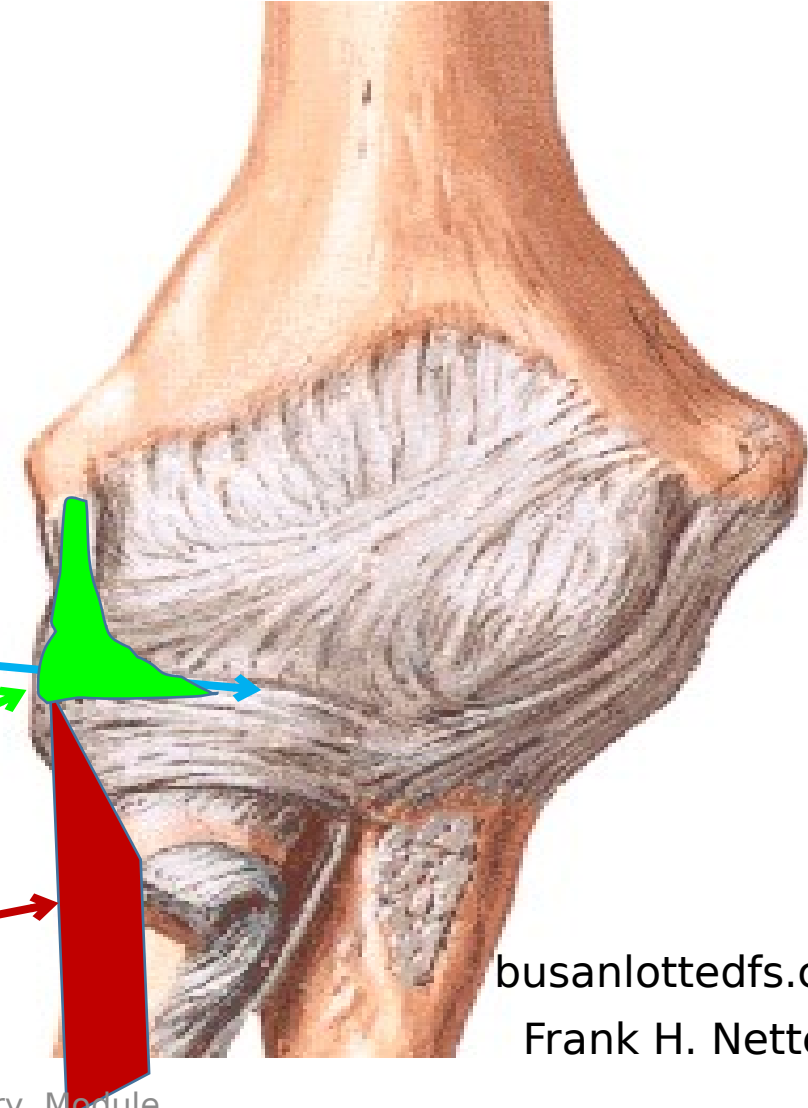
@ Movements:

Pronation & supination ??.



Annular ligament

- Surrounds the head of radius & keeps it in position.
- Attached to the ant. & post. margins of radial notch of ulna.
- Its upper border is continuous with the capsule of elbow joint.
- Its outer (lat.) surface gives origin to **radial collateral lig. of elbow**



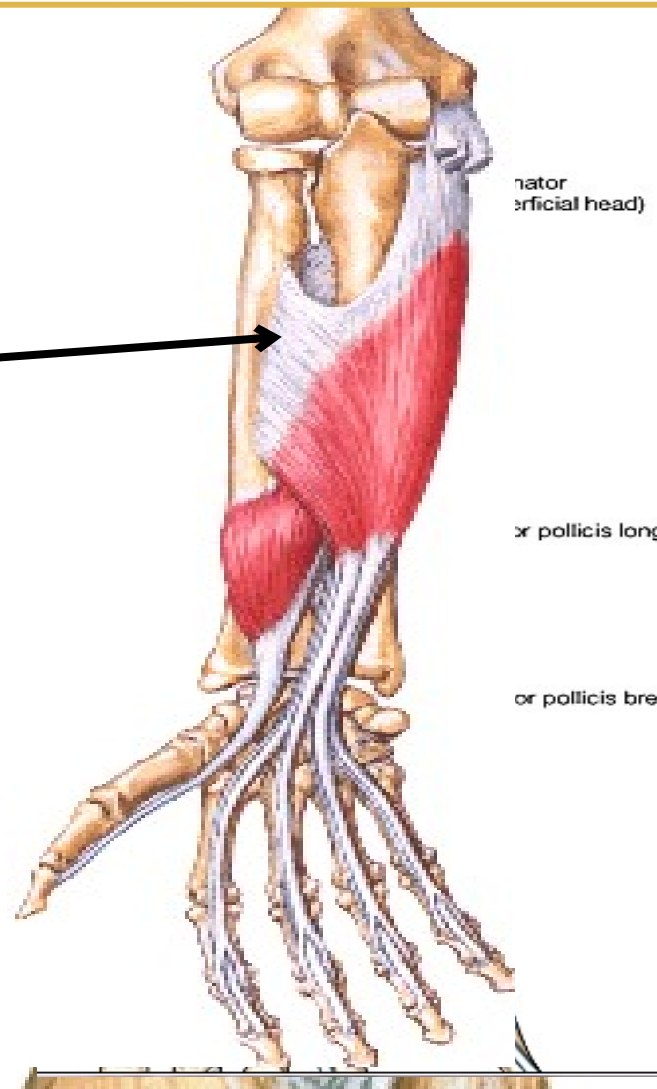
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2) Middle Radio-ulnar Joint = Interosseous membrane



(fibrous joint)

Gives additional origin for
Deep flexors
& **Deep extensors**
of the forearm



— Gap for post.
interosseous
A. to pass
post.

Interosseous
border

Directed down &
med. (from
radius to ulna)

— Gap for ant.
interosseous
A. to pass
post.

Elsevier. Drake et al: Gray's
anatomy for student – www.studentconsult.com

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2) Middle Radio-ulnar Joint = Interosseous membrane



(fibrous joint)

- It is a fibrous membrane connecting the interosseous borders of radius & ulna (*beginning 1 inch below radial tuberosity*).
- Its fibers are directed down & med. (from radius to ulna) → transmission of shocks from the hand to radius & then to ulna.
- It gives additional origin to the deep flexors & extensors of forearm.
- It presents 2 gaps:

1) An upper one (for the passage of posterior interosseous A. to the back of forearm).

2) A lower one (for the passage of anterior interosseous A. to the back of wrist joint)

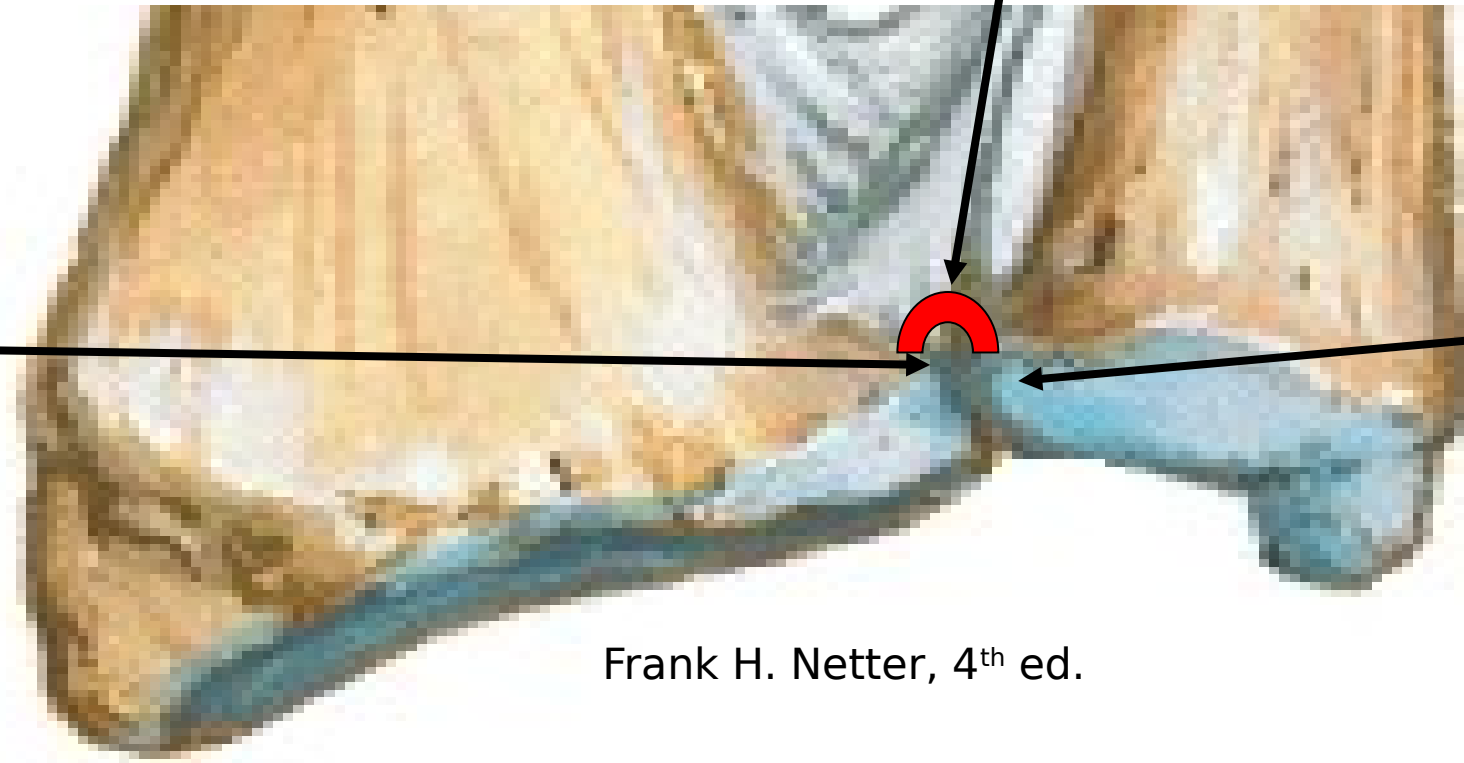
3) Inf. Radio-ulnar Joint (synovial- pivot)



Recessus Sacciformis

**Ulnar notch
of radius**

**Head of
ulna**



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3) Inf. Radio-ulnar Joint (synovial- pivot)



@ Type: Synovial- pivot.

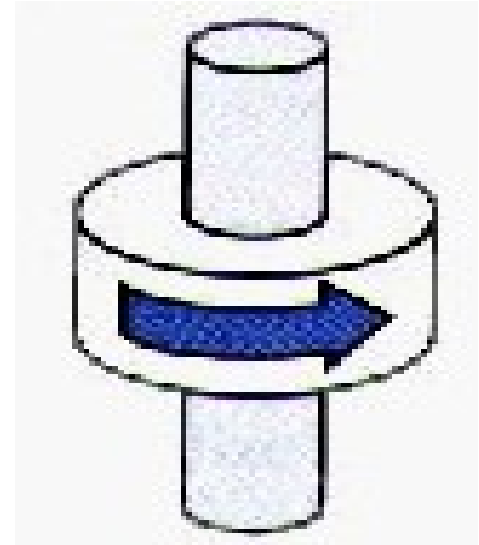
@ Articular surfaces:

1- Head of ulna.

2- Ulnar notch of radius.

@ There is a recess projecting upwards from its capsule, called Recessus Sacciformis.

@Movements: Pronation & supination ??



Radio-ulnar joint diseases



1) The **proximal radioulnar joint** communicates with the elbow joint, whereas the **distal radioulnar joint** does not communicate with the wrist joint.

• In practical terms, this means that infection of the elbow joint invariably involves the proximal radioulnar joint.

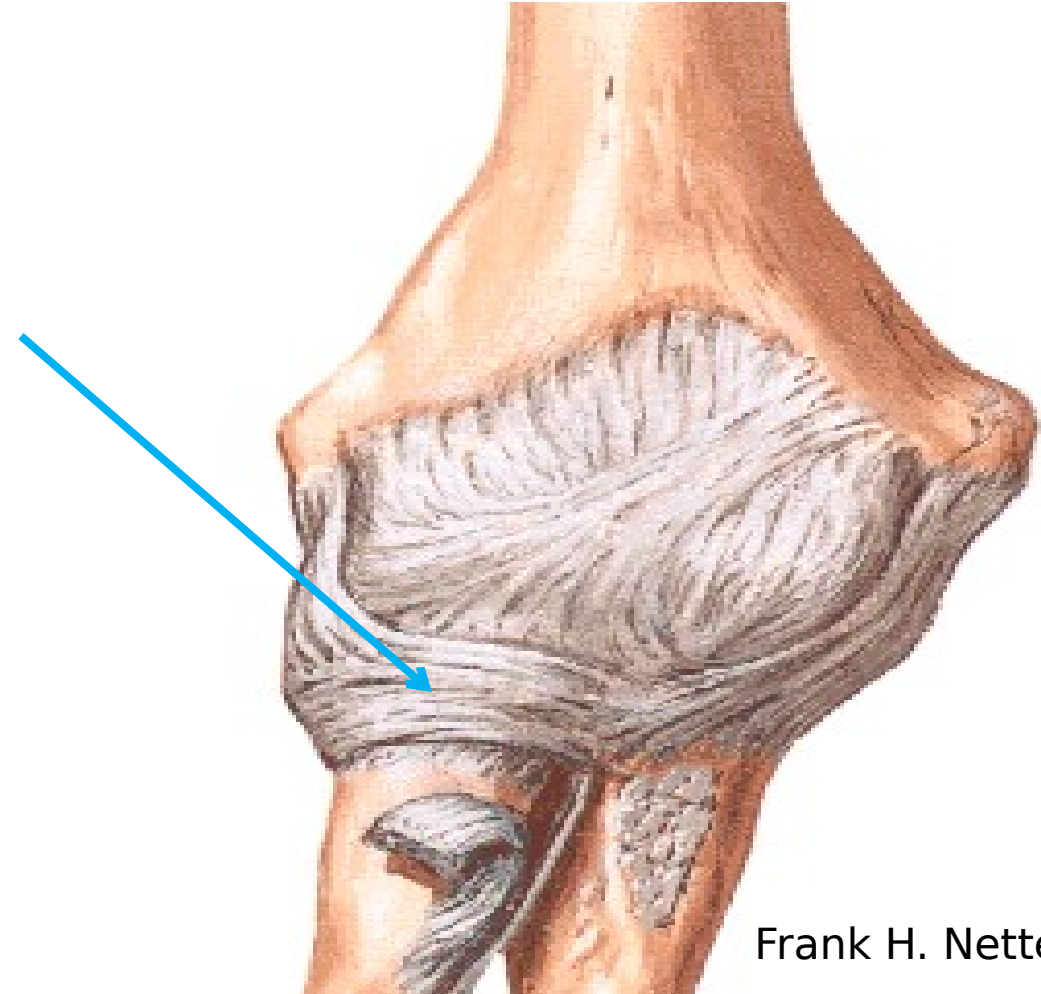


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Radio-ulnar joint diseases



2) The strength of the proximal radioulnar joint depends on the integrity of the strong **annular ligament** which can be ruptured in young children, in whom the head of the radius is still small and undeveloped.



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Pronation & Supination

**Axis connects
head of radius
with head of
ulna**

Supination

R // U

Radius

Stronger

**From head
to radius
till head of
ulna**



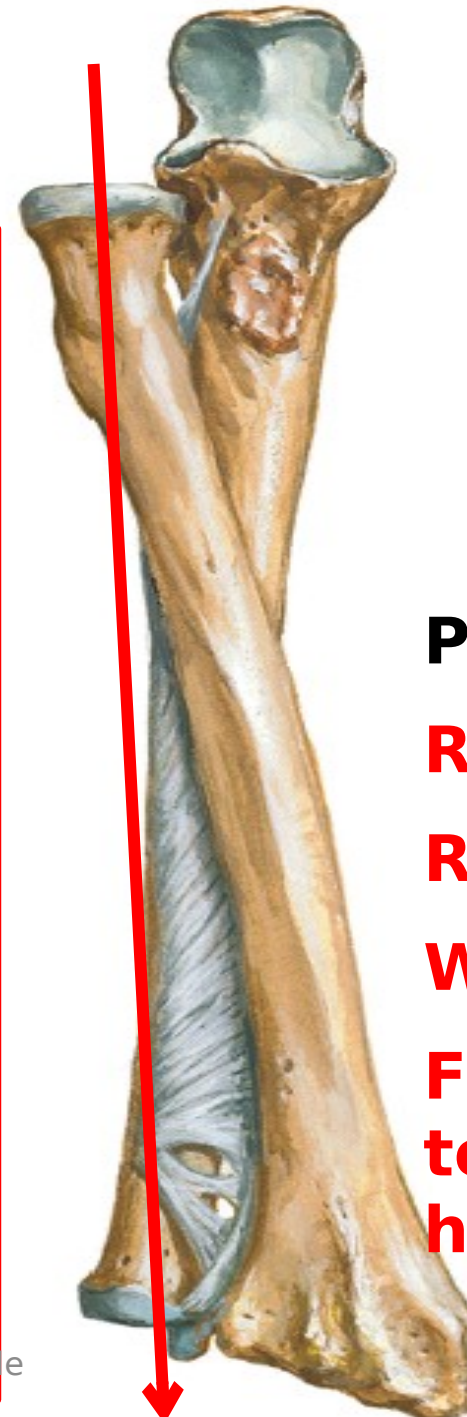
**Axis of
pronation &
supination**

Questions:

- 1) What is relation of ulna to radius?**
- 2) Which bone moves? Is it important?**
- 3) Which movement is stronger?**
- 4) What is the axis of both movements?**

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Musculoskeletal & Integumentary Module



Pronation

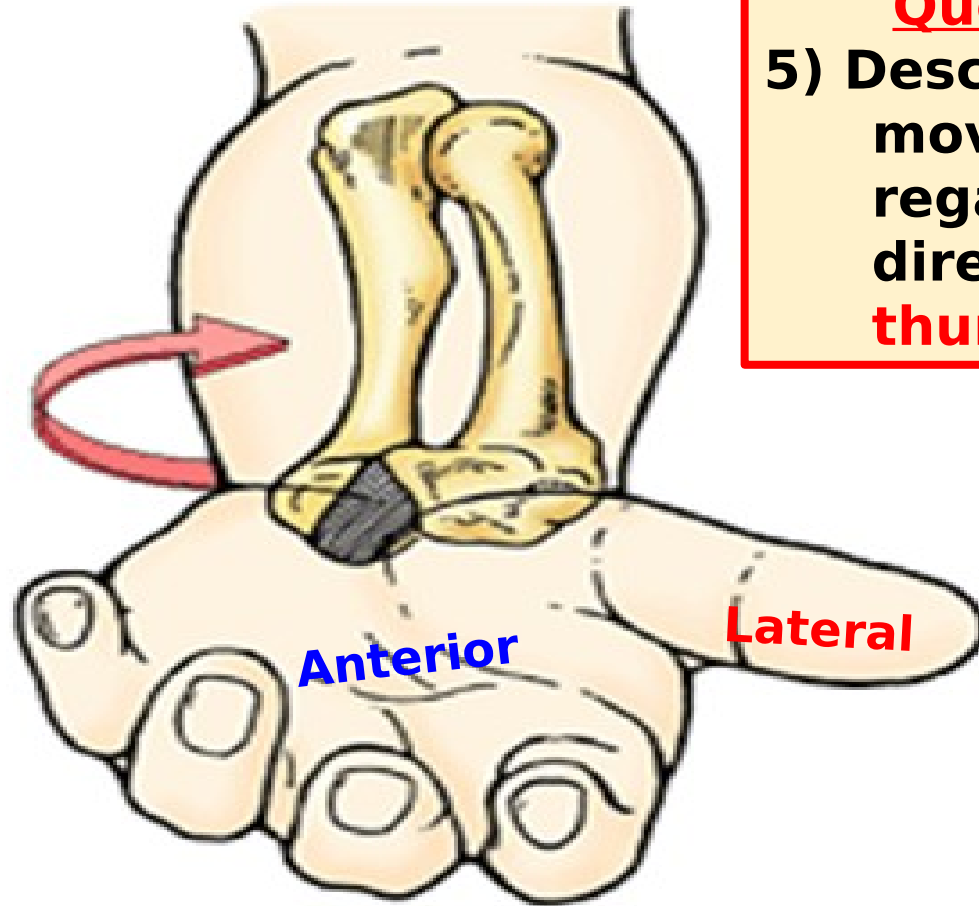
R X U

Radius

Weaker

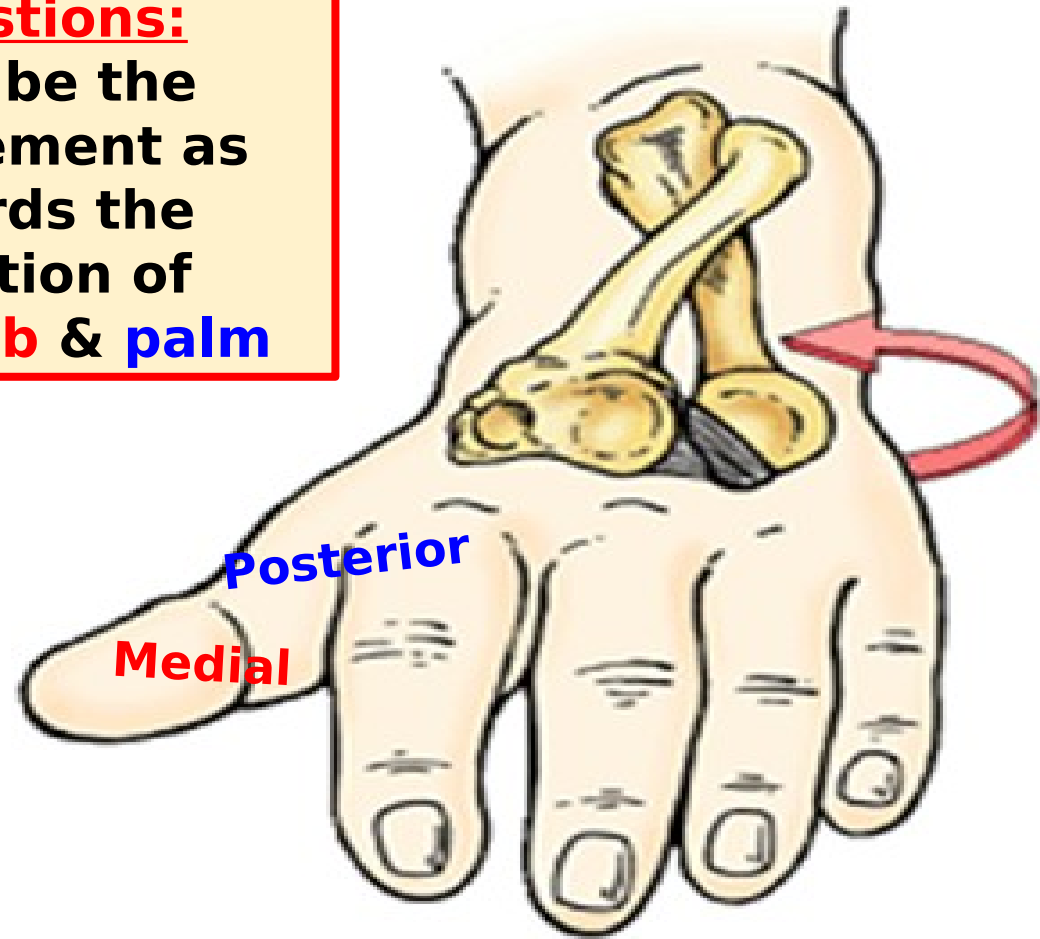
**From head
to radius till
head of ulna**

Questions:
5) Describe the movement as regards the direction of **thumb** & **palm**



Supination

Beggars



Pronation

Kings

Lecture Quiz



Which of the following structures is responsible for preventing dislocation of the superior radio-ulnar joint?

- A. Brachioradialis muscle.**
- B. Radial collateral ligament of elbow.**
- C. Recessus sacciformis.**
- D. Qudarate ligament.**
- E. Annular ligament.**

Lecture Quiz **Answer**



Which of the following structures is responsible for preventing dislocation of the superior radio-ulnar joint?

- A. Brachioradialis muscle.**
- B. Radial collateral ligament of elbow.**
- C. Recessus sacciformis.**
- D. Qudarate ligament.**
- E. Annular ligament.**

SUGGESTED TEXTBOOKS



Snell Clinical Anatomy by regions 9th edition, p. 408- 410
& figure 9.74 in page 410.

THANK YOU

